



Skyline Soaring Club, Inc.

Tow Pilot Manual

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Basic Qualifications

As a minimum, all Skyline Soaring Club (SSC) tow pilots shall be members of SSC and the Soaring Society of America (SSA); hold a Private Pilot certificate or higher with an airplane single-engine land rating; have a tailwheel endorsement or have logged tailwheel flight time as per 14 CFR Part 61.31(i); have a current Third Class medical certificate or higher; and possess a current Flight Review as per Part 61.56. A High Performance endorsement or previous experience per Part 61.31(f) is also required for Pawnee operations. As Front Royal airport is within 60 NM of the DCA VORTAC, each tow pilot will have the required ADIZ training completion certificate available for inspection while serving as an SSC tow pilot.

Flight Experience

A minimum of 200 hours total flight time in airplanes, including 10 hours as pilot in command of single-engine tailwheel airplanes, is required to begin SSC tow pilot training in the Husky. As a general rule, each new tow pilot will complete a checkout in the Husky prior to checkout in the Pawnee.

Training

All prospective tow pilots must complete the Soaring Safety Foundation (SSF) on-line Tow Pilot Course. He or she must then satisfy the requirements of 14 CFR Part 61.69.

Final qualification will include at least 10 dual actual glider tows. After the Chief Tow pilot has insured that the prospective tow pilot has the requisite knowledge, skill, and experience, he will endorse the new tow pilot's logbook with a statement that he is qualified to tow gliders per 14 CFR Part 61.69. The Chief Tow pilot will then make the final recommendation to the Board of Directors for the member's qualification as an SSC tow pilot.

Currency

SSC qualified tow pilots must meet the currency requirements of 14 CFR Part 61.69.

General Aero Tow Procedures

The following is intended to be a guide to SSC-unique towing procedures, and not an exhaustive description of all towing considerations. Refer to the [Glider Flying Handbook](#), Chapter 7, and [Towpilot Manual by Burt Compton](#) for additional in-depth towing information. Numerous other texts and websites exist.

Preflight.

Upon arrival at the field, the tow pilot must conduct a thorough preflight of the tow plane. It's particularly important to inspect the tires for condition and inflation (note: the tailwheel tire should be firm and without sidewall bulge), drain water from fuel tanks and lines(not while inside hangar), and check the condition of the landing gear attachments, tailwheel springs, and tow hook. Apply engine preheat when ambient temperatures are below freezing. If the fuel tanks are not appropriately filled, refuel before flight operations commence.

Jump starting procedures

The towplane shall not be started by jumping from the tow car. The towplane battery may be recharged by connection to the towcar, but the towplane shall not be started while connected.

The Tow Pilot is responsible for the safety and proper operation of the tow plane and launch operations. The Tow Pilot shall not leave the pilot's seat while the prop is turning.

Taxi

It is important to hold the stick properly during taxi. Controls should be set to "climb into or dive away" from the wind as required. Be vigilant for ground personnel.

Run-up

Perform run up in accordance with the aircraft operating manual. As a minimum, check mags, carb heat, controls for freedom of movement, brakes, and fuel quantity.

First flight of the day

SSC encourages tow pilots to make a checkout flight each towing day with a climb to altitude (i.e., 3000 feet AGL) to check out the tow plane's systems and to re-familiarize themselves with its handling. Perform a stall, check the stall warning system, and return for landing. If not current for landings within the preceding 90 days, the tow pilot shall complete three landings prior to the first tow of the day.

Takeoff

When the line crew signals that they are ready for you, start up and taxi to a position in front of the glider to be towed. The line crew may indicate which glider is to be towed by holding both hands palms facing each other, and moving them back and forth in the direction of lineup. They will indicate the desired release altitude by holding up the appropriate number of fingers. In the event that no indication is made, the tow pilot should assume 3000 feet above ground level (AGL). After the line crew has attached the tow line to the tow plane, (or extended the towline from the TOST reel), and has given the signal to take up slack, taxi forward until the tow line is taut. At FRR, the tow plane will normally be approximately abeam of the visual glide slope indicators when a 200 foot tow line is fully deployed.

During lineup, the glider pilot should initiate a communications check. If no transmission from the glider is heard, the tow pilot should initiate a communications check with the glider. If the communications check is unsuccessful, insure that the towpilot and glider pilot are in agreement on the tow to be performed.

The line crewman will signal when to stop by holding his hands over his head. After stopping, perform the takeoff check list and observe the line crew for the next signal.

When the glider pilot is ready for takeoff, he will instruct the wing runner to "raise the wing". The signal to start the takeoff is the glider pilot fanning the glider's rudder back and forth, followed by the wing runner rotating his arm in the takeoff signal. The tow pilot shall acknowledge "ready" by wagging the tow plane's rudder, make a takeoff radio call, insure the mixture is full rich, and advance the throttle smoothly for takeoff. As the glider tow hook is well below the center of gravity of the glider, sudden tow plane acceleration may cause the tail of the glider to bang down on the ground. On the other hand, accelerating too slowly is not good either. If in doubt about whether or not you are applying the throttle at the proper rate, ask the instructor in the glider after he lands. In general, gliders that rest on a nose skid need a more gentle acceleration from rest, while some glass ships need more aggressive acceleration to reach minimum control

speed in a cross wind.

Do not hold the tow plane a few feet off the ground as you accelerate and then zoom up into the air. It is extremely difficult for a new student to follow this type of maneuver. Make your acceleration from liftoff speed to climb speed while in a shallow climb, avoiding any abrupt changes in your climb angle. Allowing the tow plane to drift slightly downwind during the initial climb will facilitate the glider's maneuvering for a downwind landing, if required (See SSC Operations Manual, Appendix B, Figure B.4).

CAUTION:

Tow pilots have been known to start their takeoff when they observed the glider wagging his rudder as part of his takeoff checklist and while the wing was still on the ground. Occasionally, takeoffs will be made with the wing of the glider resting on the ground, (unassisted takeoff) but you will be informed of this in each individual case. Unless you are specifically briefed to do so ahead of time, never start your takeoff unless:

1. Glider wings are level
2. Spoilers are closed
3. Canopy is closed
4. All line crew are clear
5. You see the rudder wag
6. Wing runner gives takeoff signal
7. The runway and pattern are clear

Remember, regardless of any signals you receive from anyone else, you are still responsible for checking to make sure it is safe to start your takeoff.

If you experience any problem during your takeoff roll, pull the emergency release handle, abort the takeoff, and pull off the left side of the runway, if possible. Do not stop short; keep the tow plane rolling so the glider does not climb up your back. The glider should pull off to the right, but as some gliders lack directional controllability at low speeds, you cannot depend on the glider pilot being able to point the glider where he or she wishes.

If you feel the tow line break during takeoff, even though you may believe you can stop the tow plane before you reach the end of the runway, continue the takeoff so the glider will have a clear shot at an emergency landing, either on or off the field. Emergencies rarely happen, but they are possible, and you should constantly keep in mind what you would do if they should occur.

Climb

Fly attitude, and make minor adjustments to your pitch attitude to maintain tow speed. Do not allow the glider to overpower the tow plane. This will require, at times, heavy control pressures in the tow plane, but it is a necessary evil.

When towing gliders that are unfamiliar to you, have the line crew inquire of the glider pilot what tow speed they desire. The Schweizer tow speed is 65 MPH indicated airspeed (MPH IAS)/(56 KIAS). Most of the Skyline club glass gliders can be safely towed at 70 MPH IAS (60 KIAS) or higher, as requested. Beware of low tow speeds causing excessive cylinder head or oil temperatures.

If you experience a power loss, engine failure, or other emergency after becoming airborne, signal the glider by rocking your wings, maintain safe airspeed, and look for a safe place to land. If the glider does not release immediately, pull the emergency tow release handle. Execute engine restart procedures, if able. If, after the glider is released, you find you still have partial power, use your own judgment as to whether you will be able to return to the airport or be forced to land in the first available field.

You should plan your climb so the release point is upwind of the airport. The release point for a 1500 foot tow is over the airport. On a cloudless morning, it is often difficult to judge the winds aloft. Therefore, until

the winds aloft have been determined, you should be over the airport when the glider is released. One reason for releasing the gliders fairly close to the airport is that it reduces the time it takes for the tow plane to return to the field. However, when winds aloft are strong, you have no choice but to take the glider upwind some distance from the airport. Do not tow the glider downwind of the airport, especially at low altitude or in strong winds. Make the initial climb (first 1000 feet AGL) within the normal traffic pattern of the airport, i.e., on a crosswind and downwind pattern, then turn on course for the remainder of the climb.

During climb, you should NEVER FLY TO A POSITION FROM WHICH THE GLIDER CANNOT RETURN TO THE AIRPORT. Fly along straight legs, turning only when necessary to keep from getting too far from the airport. Turn with bank angles of between 15 and 20 degrees. Steeper banks are hard for students to follow, while shallower banks take too long to make the turn. Although climbing turns in thermals are encouraged when towing solos, do not do so when towing duals. Students require long straight legs to perform their practice maneuvers. However, you can make use of lift even while flying straight legs by directing your course under building clouds, or through areas of known lift. Try to position the glider for release in lift if you can. Be clever.

Do not allow yourself to be steered by the training glider, unless prior to takeoff the glider pilot has requested you to do so. If a student gives you such a rough tow that you feel the instructor is allowing the student to get too far out of position, inform the duty officer so he can discuss it with the instructor involved.

Note: While towing, you may fly through areas of exceptionally good lift and may be tempted to wave the glider off by rocking your wings. DO NOT. Chances are that the glider pilot will encounter sink right off tow rather than lift and he will hold you responsible. There is a variometer in the glider, and if the pilot wants to release early in lift, he will do so on his own. Do not wave-off a glider simply because it has not released after reaching 3000 feet AGL. He may have elected to take a 4000 foot tow, may feel he is not in a position to make it back to the field, or may be unable to release. If the glider has not released by the time you have reached 3200 feet AGL, return to the airport and visually observe him to see if he is signaling his inability to release (glider moves to left side of tow plane and rocks wings). If everything appears to be normal, continue climbing while returning to the field. However, if the glider pulls out to the left and rocks his wings, return to a point directly over the airport at your present altitude and pull the release in the tow plane. Be sure that the glider is above you when you pull the release so the glider will not be struck by the tow ring and/or fouled by the tow rope.

Use discretion when signaling the glider by fanning the rudder. In general, this signal should only be used at a minimum altitude of 1000 feet AGL, due to the tendency of glider pilots to mistakenly interpret this as a request for immediate release. If the glider configuration is in question, make a radio call or wait for sufficient altitude prior to fanning the rudder.

Descent

The objective in towing is to get the glider to reach altitude as quickly as possible and return the tow plane to the airport for another tow. While the rate of climb is limited by the performance of a particular tow plane, rate of descent is largely controlled by pilot technique. As this is a club operation, safety and conservation of assets are extremely important in this phase of the tow.

In order to protect our investment and keep repair costs to a minimum, the club has a recommended descent procedure. The intent of this procedure is to prevent cylinder head cracking caused by shock cooling (cylinder head temperature drop greater than 50 degrees F. per minute) due to large reductions in throttle position, and to minimize our exposure to midair collision.

The essence of proper descent technique is to retain a sufficiently high power setting in the descent so as to prevent rapid cooling of the engine. This may be accomplished in a number of ways.

At glider release, as confirmed by its turning right after release, stop the climb with forward stick while rolling into a left bank, turn left 90 degrees, and avoid climbing above release altitude. Maintain straight and level flight for one or two minutes to maximize the lateral separation between yourself and the glider. Reduce power slightly. (1 to 2 inches manifold pressure in the Husky, i.e., 22 to 23 inches; and 100-200 RPM in the Pawnee, i.e. 2300 to 2400 RPM.) Roll in nose down trim as airspeed increases towards 100 MPH IAS. Do not exceed 100 MPH IAS while retracting the towrope. Lean the mixture. Reduce power slightly every half-minute to keep an even, but aggressive, rate of cooling. Monitor cylinder head temperatures during descent to avoid shock cooling (i.e., a cooling rate greater than 50 deg. F per minute).

Keep your head on a swivel during the descent and try to keep track of aircraft in the pattern, those transiting the area, and the glider you have launched.

An alternate descent procedure (flaps full down and steep spiraling letdown), while effective at preventing shock cooling, may present an excessive exposure to midair collision due to limited cockpit visibility in steeply banked turns. Slow speed letdowns with full flaps may be used if restricted to no more than moderately banked turns.

If the Tost reel is inoperative, or when towing with the Husky, allow for towline drop during the approach. Do not fly over people, animals, buildings, or power lines at low altitude. When landing, come in high and slip, if necessary, so the end of the towline clears any obstacles. Drop the towline short of the runway in the clear way, or alternatively, at the side of the runway. Ensure that the tow rope is dropped well clear of the road to the immediate east of the airport. Never assume the line has dropped. Keep your flight path over clear areas, then land.

Landing

Due to the potential for increased tire and brake wear, wheel landings and no-flap landings are discouraged. Watch for gliders flying the downwind and base leg from the opposite side of the airport. Power training flights tend to fly quite wide downwind legs with very long final approaches. After landing, clear the runway at the midfield taxiway, if practical, scan for ground traffic, taxi to the ramp area, and check the line crew either by radio or by hand signal to either "line up" or "shut down" (hand across throat to signify park and shut down). If directed to line up, taxi in front of the glider to be towed and follow the procedure outlined above. Be extra vigilant for ground personnel.

Refueling

Check fuel level before each takeoff. Make a radio call to Skyline Ground Ops to inform them of when you need to refuel. After refueling, check both fuel tank drains for water and both gas caps for security. Members are encouraged to assist the tow pilot during refueling.

Weather Considerations

Keep alert for changes in the weather. If you see a storm approaching the airport, notify the duty officer and advise if you recommend canceling flight operations. It is no fun tying down gliders in the middle of a thunderstorm. If crosswinds or gusts are so bad on takeoff or landing that they make flight operations hazardous, inform the duty officer.

Headwork Items

Do not fly when you are fatigued or ill. Do not wait until you feel you can no longer fly to ask for relief. Give the duty officer some warning so he can help line up a relief tow pilot for you.

Securing the Aircraft

At the completion of flight operations, top off the fuel. Check mag switches for grounding by cutting them off and then back on together with the engine idling and noting the cutout. Clean the sparkplugs by setting 1700 RPM and leaning the mixture to peak EGT for about 1 minute, then shutdown by pulling the mixture to idle cutoff. When securing the aircraft, make sure all switches (mags, master, fuel pump) are off and that the throttle and mixture are closed. Leave the anti-collision light switch on at all times. This serves as an outwardly visible indicator if the master switch is inadvertently left on. Give the plane a thorough post-flight inspection. Particularly check the induction and exhaust systems for leaks, carburetor and carburetor heat box for security, oil leaks in general, spark plugs and mufflers for security, and the condition of the tail wheel leaf springs. Wipe out oil from the inside of the cowling and on the lower fuselage and landing gear struts. Bring any discrepancies to the attention of

the DO and enter the discrepancy in the aircraft notebook. Note the start and stop tach times and the total fuel and oil added for the day in the aircraft notebook and give this information to the DO. Make a notation in the logbook if any oil is added. An email to the Tow Pilots Listserv (towpilots@skylinesoaring.org) is an excellent way to advise fellow tow pilots of the airplane's condition. If the aircraft is unable to fly the next towing day, notify your fellow towpilots and copy the Members Listserv (members@skylinesoaring.org) to advise them of towplane status. Consider also making a call to the Pawnee meister or the Husky meister, as appropriate.

If the tow plane is to be parked outside, the flaps must be extended to the full down position and cowling plugs should be installed (if available) as the last item just before you leave, to keep out birds. Give the engine as much time as possible to cool prior to installing cowl plugs.

The Aviat A-1 Husky

The following is intended as a general overview of Husky operations. Refer to [Husky 101](#), by Jeff Welch, for detailed Husky flying techniques.

V speeds in MPH IAS

Vs0	37	Vglide	73	Va	94
Vs1	40	Vfe	73	Vno	119
Vx	58	1.3 Vso 48		Vne	153
Vy	73				

Power is supplied by a Lycoming O-360-C1G, giving 180 BHP @ 2700 RPM. This is a carbureted engine with a constant speed propeller.

Taxiing the Husky may require S turning on the taxiway to continuously clear the area ahead of you. Take special care when operating near the ground crew. Visibility is an issue in the Husky, as it is difficult to see under the nose during taxi, and difficult to see the glider during takeoff and tow. Moreover, it is often difficult to feel the glider's release.

Preflight

The Husky has three fuel drains. Two are under the wings at the roots and one is under the engine firewall. The Husky is equipped with a Schweitzer towhook, requiring the larger tow ring. The DO will perform the droppable towrope preflight inspection as per the SSC Operations Manual, paragraph 4.3.4.

Fuel

100 octane fuel is required. The Husky has two fuel tanks containing a total of 50 usable gallons. The fuel gauges are accurate in level flight only. On the ground, these sight gauges indicate the fuel to be approximately 1/8 greater than the actual fuel on board. Typically fuel the airplane to 25 gallons by fueling until the gauges indicate 1/8 of a tank above the 1/2 mark. Fueling to 50 gallons will preclude carrying any back seat passenger or flight instructor due to weight and balance limitations.

Fuel consumption is approximately 10 GPH actual time (8 gph tach) or approximately 2 gallons/tow to 3000 feet AGL.

Oil

Use Phillips 20W50. Maximum oil capacity is 8 quarts; maintain oil level between 6 and 8 quarts. If the oil level is found below 6 quarts at the start of an operating day, the tow pilot should add oil.

Tires and Brakes

The Husky has individual toe brakes, including a parking brake pull-tab for each. Main wheel tire pressure is 25 psi; tailwheel pressure is 50 psi.

Starting Procedures

Prior to engine start, perform a thorough preflight. Check mags off, mixture off, throttle closed and pull prop through for 12 blades. Prime according to the temperature: 5 shots @ 30F or below; 1 shot less for each 10F above 30F . i.e., 4 @ 40F, 3 @ 50F, 2 @ 60F, 1 @ 70F and above. Pulling through another 6 to 8 blades can further loosen up the engine oil, distribute the fuel, and reduce the starter/battery load during the subsequent start. Apply engine preheat when ambient temperatures are below freezing.

Perform Pre-start cockpit check:

- Controls free
- Seatbelt fastened
- Mixture rich
- Flaps up
- Battery master on
- Crack throttle open 1/4 inch
- Announce "CLEAR PROP"
- Engage starter

After start, keep RPM below 1000 while waiting for oil pressure to rise above minimum pressure. Shut down the engine if no oil pressure indication is noted within 30 seconds.

Slowly lean the mixture to about one inch of silver showing on the mixture control. Use this mixture position for all ground operations except runup, T.O. and climb. Advance mixture to full rich before adding T.O. power.

Engine Run-up

DURING ENGINE RUN-UP, ENSURE THAT YOU HOLD THE STICK FULL BACK AND THE BRAKES FIRM.

- Set 1900 RPM with mixture setting at RICH.
- Check mags, left and right, 25 to 125 RPM drop.
- Check carb heat for 100 to 125 RPM drop.
- Check propeller control at 1700 RPM, cycling three times.

Takeoff

Liftoff will occur at about 50 MPH IAS. Do not try to force or pull the aircraft into the air; let it fly itself off the ground. Takeoffs and tow in the Husky are made FLAPS UP and at 65 to 70 MPH IAS (depending on type of glider on tow).

The power setting for climb is full throttle and 2500 RPM. Avoid partial throttle climbs due to the leaning of the mixture that occurs due to the closing of the carburetor economizer valve.

The Tow Pilot shall operate the transponder, including Mode C equipment, on code 0130 as per the Potomac Tracon Memorandum of Understanding when towing in the vicinity of FRR, on VFR code 1200, or on the code assigned by ATC, as appropriate.

Note: Tow pilots should not carry non-member passengers while towing. Members who are prospective Tow Pilots, Tow Pilots in training, and interested glider pilots may ride with approved Tow Pilots during glider towing operations. Operational needs should inform the decision to carry an additional pilot in the rear seat.

Release

Use standard release procedures.

Descent

Avoid shock cooling by maintaining sufficient power on the engine and/or limiting airspeed. Selecting a lower propeller RPM (2000) will assist in descent while maintaining at least 20" of manifold pressure.

Landing

Approaching the traffic pattern, perform the landing checklist. Maintain 70 MPH IAS on downwind and 65 MPH IAS on base leg while gradually reducing power. Be careful to not overspeed the flaps (73 MPH IAS maximum).

On short final, use power as required (very little). Final approach in the Husky is made at 60 MPH IAS with full flaps.

Tow Release Handle

The tow release handle is located on the floorboard just forward of the pilot's left knee. When dropping the tow rope, a pull of less than 1 pound is required.

Full flaps are to be used on every landing to minimize the risk of ground loop. After touchdown, keep the stick full back and raise the flaps. This will help avoid nose over. Avoid brake use until reaching the FRR midfield taxiway at taxi speed.

Refueling

Check the fuel gauges carefully when refueling, as overfilling is easy to do.

Husky Personal Use

The primary mission of the SSC's Husky is to train tow pilots, to provide supplemental tow capacity, and to serve as a backup towplane for the Pawnee when it is not available. Additionally, the Husky may be operated for personal use in an aircraft rental-like arrangement for currency, proficiency, and other local and cross country flying.

SSC qualified Tow Pilots and approved Tow Pilot candidates have the privilege of personal use of the Husky on a not-to-interfere basis with normal SSC soaring activities. Personal flying on scheduled SSC operating days will be limited to a 50 nm radius of Front Royal airport (FRR). Pilots will monitor the FRR CTAF frequency in order to respond to recall requests from SSC ground ops. On non-operating days, personal flights will be conducted so as to ensure Husky availability on subsequent SSC operating days.

Pilots wishing to fly the Husky for personal use shall ensure the Pawnee is available to support normal SSC soaring operations and will check with the scheduled DO to resolve any other possible tow plane requirements.

Scheduling the Husky will be done via the Club's Duty Roster in the notes section for the hours/day(s) desired. Additionally, pilots using the Husky should email their flying plans to the Towpilot Listserv in order to coordinate schedules and promote awareness of the location of the Husky.

Cross country operations are only authorized for SSC (Full or Probationary Member) pilots who are cleared to fly the Husky as PIC without an Instructor and are currently designated as SSC tow pilots or tow pilot candidates. The pilot may conduct operations for which he/she and the aircraft are certified and current to perform; an exception is "for hire" operations, which are not authorized. Pilots shall only land at airports that are in the Airport/Facility Directories and/or on NACO Aeronautical Charts. If the pilot leaves the Husky unattended, he/she shall secure the flight controls and the airplane with wheel chocks and tie downs.

Pilots will be charged according to the SSC rate schedule per Tach hour for personal use. The pilot will be reimbursed for fuel and oil purchased at locations other than FRR at a rate not to exceed the rate charged at FRR. If maintenance is required at locations other than FRR, the pilot shall be eligible for reimbursement of any reasonable maintenance services purchased, subject to board approval. Pilots shall coordinate such maintenance requirements with an SSC board member prior to having the work performed.

Personal time for the Husky is to be billed by use of the aircraft log and the pink billing slips in the aircraft. After personal use, the pilot will provide notification of tach time flown, fuel purchases, and required maintenance to the SSC treasurer.

The Piper PA-25-250 Pawnee

The Club's Pawnee was designed as a crop duster, thus intended for hard work, with a 250 hp Lycoming O-540 six cylinder engine and a four-blade low-noise Hoffman propeller. The light weight of the Pawnee and its large engine give the aircraft excellent towing capability, reliability, and all around safety. Although the maximum gross weight of the plane is 2900 pounds, in our operation we typically operate at about 2000 pounds gross weight. The cockpit design provides nearly 360 degrees of visibility. For a number of reasons, the Pawnee is considered the club's primary tow plane, and should be used accordingly when choosing whether to fly the Husky or the Pawnee.

N90866 has been equipped with a pulselight system to enhance collision avoidance. Select the small

pulselight toggle switch on the subpanel to on, and select the rate of pulse, fast or slow, with the push button as desired. When the landing light switch is on, the landing light is on continuously, so the landing light switch should be off during normal towing operations.

A Bose noise canceling headset is also provided. It should remain plugged in at all times. Adjust the noise canceling feature with the handset. Personal headsets may be used with the jacks provided.

The Pawnee's most unusual feature is its long nose and the downward slope of the cowl. This presents a very unusual picture to the pilot when in level cruise and in the touchdown phase of landing. While landing, bringing the nose above the horizon, as with most taildraggers, may slam the tailwheel down at touchdown. Not desirable. The landing attitude for touchdown is just the same as viewed by the pilot when sitting on the ground.

V Speeds in MPH IAS

Vs0	60	Vglide	80	Va	120
Vs1	61	Vfe	109	Vno	124
Vx	71	1.3 Vso	78	Vne	156
Vy	83				

Preflight

The Pawnee has FIVE fuel drains. Two are under the cockpit at the left wing trailing edge, one is under each wing fuel tank, and one is under the engine firewall. The Pawnee is equipped with a Tost reel, and a Tost release for a droppable tow line, requiring the smaller Tost ring. The duty tow pilot will perform the Tost reel towrope preflight inspection, extending it fully and removing the right side access panel to do so.

Fuel

Due to the 250 HP Supplemental Type Certificate (STC) conversion, auto gas cannot be used. The Pawnee has two main fuel tanks containing a total of 36 usable gallons. A fuel shutoff valve is located at the right side of the cockpit. It normally remains open (down) at all times, but should be closed for a forced landing.

Two underbelly drains require preflight action. One is for the header tank and the other for the vent line. From the Pawnee operating manual, section 2, fuel system: "One-way check valves are used in the vent line to prevent excess fuel overflow during taxi turns or uncoordinated flight. These check valves have two pressure release holes which bypass the check valves and will allow slight overflow during thermal expansion of a full tank." Also, from section 3, preflight checklist: "Drain tank fuel vent line until all water or fuel is drained out." Therefore, if this fuel vent line drain is not emptied during preflight inspection, it backs up fuel in the expansion tank, fills it and allows it to drain overboard.

Fuel consumption is approximately 14 GPH actual time (10 GPH tach) or approximately 3 gallons/tow to 3000 feet.

Oil

Use Phillips 20W50. Maximum oil capacity is 12 quarts; maintain oil level between 8 and 9 quarts. If the oil level is found below 8 quarts at the start of an operating day, the tow pilot should add one quart of oil.

Tires and Brakes

The Pawnee has individual toe brakes, including a parking brake pull-tab for each. Main wheel tire pressure is 25 psi; tailwheel pressure is 50 psi.

Starting Procedures

The Pawnee has dual electric fuel pumps in addition to an engine-driven pump. Make sure the fuel pump switch is on during all engine operations. Fuel pressure should be between 3 and 5 psi. Prior to engine start, perform a thorough preflight. Check mags off, mixture off, throttle closed and pull prop through for 12 blades.

Prime according to the temperature: 5 shots @ 30F or below; 1 shot less for each 10F above 30F., i.e., 4 @ 40F, 3 @ 50F, 2 @ 60F, 1 @ 70F and above. Pulling through another 6 to 8 blades can further loosen up the engine oil, distribute the fuel, and reduce the starter/battery load during the subsequent start. Apply engine preheat when ambient temperatures fall below freezing.

Start the Pawnee on the left magneto only. Only the left mag has an impulse coupling to aid starting. Using the right mag can lead to severe kickback while attempting start.

Perform Pre-start cockpit check:

- Controls free
- Seatbelt fastened
- Mixture rich
- Flaps up
- Left mag only on (never start on both mags)
- Battery master on
- Fuel pump on (note pressure)
- Crack throttle open ½ inch
- Announce "CLEAR PROP"
- Engage starter

AFTER START, BE SURE THE RIGHT MAG IS TURNED ON and keep RPM below 1000 while waiting for oil pressure to rise above minimum pressure. Shut down the engine if no oil pressure indication is noted within 30 seconds.

In cold weather, after starting, it may be necessary to add a primer stroke or two to keep the engine running. Do not pump the throttle in an attempt to keep the engine running, as an induction fire may result. Do not leave the primer unlocked or pulled out during start as this may allow excess fuel to be sucked into the engine and contribute to a fire.

Slowly lean the mixture to the "mark" on the mixture on the control quadrant. Use this mixture position for all ground operations except during run-up, T.O. and climb. Advance mixture to full rich before adding T.O. power. (After glider release at top of climb, slowly reduce power in stages to below 2000 RPM & reset mixture to the mark while keeping airspeed no higher than 110 MPH IAS.)

Engine Run-up

DURING ENGINE RUNUP, ENSURE THAT YOU HOLD THE STICK FULL BACK AND THE BRAKES FIRM.

Set 1800 RPM with mixture setting at RICH. Check mags, left and right, 25 to 125 RPM drop. Check carb heat for 100 to 125 RPM drop.

Takeoff

Liftoff will occur at about 60 MPH IAS. Do not try to force or pull the aircraft into the air; let it fly itself off the ground. Takeoffs and tow in the Pawnee are made FLAPS UP and at 65 to 75 MPH IAS (depending on type of glider on tow).

Release

Ensure that the maximum engine RPM of 2575 is not exceeded. This is quite easy to do as airspeed increases to 80 MPH IAS and above, as the 4 bladed Hoffman propeller is a "climb prop". The Tost retract switch and its respective circuit breaker are located on the left side of the panel. Do not exceed 100 MPH IAS while retracting the tow line. Rope retraction above 100 MPH can cause the end of the rope to whip against the Pawnee's rudder and elevator.

The tow release handle is just forward of the throttle quadrant. When using the tow release handle, a pull of approximately 30 pounds is required to cut the rope. The same handle is used to drop a conventional tow rope when the Tost reel is inoperative. In that case, the pull is less than 1 pound.

Descent

Maintain sufficient RPM (minimum of 2000) during descent to prevent shock cooling.

Landing

When the airspeed drops below 100 MPH on downwind, insure you have retracted the tow rope onto the TOST reel. The mirror on the left wing strut can show whether the rope is retracted or not. Approaching the traffic pattern, perform the landing checklist. About 2100 RPM should hold level flight on downwind. Maintain 80 MPH IAS on downwind and base leg while gradually reducing power on base and final.

Abeam the approach end of the runway, maintain 1800 RPM. On base leg, maintain 1600 RPM. On short final approach, use idle power as desired. Final approach in the Pawnee is made at 70 to 80 MPH IAS with flaps as desired. Touchdown should be at about 60 MPH. In strong crosswinds, half flaps or no flaps will afford more control and a reduced tendency for the upwind wing to rise during touchdown.

CAUTION:

At idle throttle and below 70 MPH, the Pawnee can (and usually will) develop a significant sink rate WITHOUT WARNING, particularly with full flaps.

The Pawnee does not float at landing speeds. During the flare for landing, avoid getting the nose too high. Remember the picture you had sitting on the ground. Following the touchdown, keep the stick full back and raise the flaps. This will help avoid porpoising.

Refueling

The Pawnee has a fuel gauge and a low fuel warning light. When the red light begins to flicker on for about 30% of the time, get fuel. Do not exceed 2.0 hours of tach time between refuelings. When refueling, leave about 1" below the filler neck to provide expansion room.